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Summary of
Research Report #11

Some Preliminary Observations on
Organizational Responses in the
Emergency Period After the Niigata,
Japan, Earthquake of June 16, 1964

R. R. Dynes
J. E. Haas
E. L. Quarantelli

Department of Sociology
December 1, 1964

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SUMMARY

On June 16, 1964 the Niigata area of Japan was struck by the strongest earthquake to hit the country since 1923. The earthquake and accompanying flooding, seismic waves and fires in the city of Niigata itself destroyed or damaged thousands of buildings and affected over 150,000 persons. A team from the Disaster Research Center of the Ohio State University conducted a ten day field study of organizational response to the emergency both in Tokyo and the disaster area itself. The research focus was on communication, control and coordination problems. Very complex disaster plans at all governmental levels appeared to have minimized difficulties created by the catastrophe.

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SOME PRELIMINARY OBSERVATIONS ON ORGANIZATIONAL
RESPONSES IN THE EMERGENCY PERIOD AFTER THE
NIIGATA, JAPAN, EARTHQUAKE OF JUNE 16, 1964

Russell B. Dynes, et al

Ohio State University
Columbus, Ohio

December 1964

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THE DISASTER RESEARCH CENTER
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO 43210

Research Report #11

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I

On June 16, 1964, at 1:02 p.m., Japan was jarred by the strongest earthquake to hit the country since 1923. The epicenter of the earthquake, which measured 7.7 on the Richter scale, was in the Sea of Japan about sixty miles off the west coast of the main Japanese island of Honshu. While shock movements were felt over two-thirds of the land area of the country, the most heavily affected region was in the Niigata Prefecture, especially the capital city of the same name which is located about 160 miles northwest of Tokyo.

Niigata is a port city of nearly 300,000 people. Much of it was burned to the ground near the end of World War II. It is therefore a relatively modern city and has a considerable amount of industry. At present the city is also the refining center for nearly all of Japan's domestic petroleum industry as well as a natural gas producing center.

Within the city, the earthquake totally or partly destroyed 8,637 houses, damaged 9,633 others, disrupted all the public utilities, severely interrupted all means of communication, and put out of commission almost all the land, sea, and air transport facilities. For instance, the port area was so damaged and the entrance from the sea was so cluttered with debris, that almost all movement into the harbor was initially blocked. Everyone of the eighteen lines of the National Railway system coming into the city were broken in at least two places. Crevasses and over one hundred and fifty landslides caused a similar blockage of movement on all the major highways and secondary roads in the prefecture. The damage to the airport prevented the flight of anything but helicopters and very small planes.

Besides direct damage as a result of the earthquake, there were other consequences. Much of Niigata is built on delta plain land and former river beds.

Over fifty percent of the land area of the city was flooded to a depth of three to five feet. The initial inundation resulted from the weakening of the embankments of the two major rivers coursing through the city. A subsequent flood came from the tsunami (i. e., tidal waves) generated by the earthquake which began arriving thirty three minutes after the initial shock and continued periodically for six hours. A later survey indicated that 11,101 buildings were inundated.

Additional destruction ensued from nineteen small and five major fires that broke out immediately after the earthquake. Particularly serious was the huge conflagration in one of the major oil refineries located near the port area at the outskirts of the city. This fire, which was still burning twelve days after the earthquake, first destroyed 90 storage tanks and eventually engulfed 302 residences and 197 other nearby buildings. For a time there was a threat that poisonous fumes would be released because the flames approached a large tank of gasoline additives and tanks containing hydrogen gas. Over 6,500 residents in this neighborhood had to evacuate their homes.

The earthquake occurred immediately after the lunch hour, so few people were cooking. Therefore, compared to the Tokyo earthquake of 1923, which struck at noon, Niigata was in less danger from extensive fire damage. In addition, the earthquake took about three minutes in building up, thus providing opportunity for people to extinguish their stoves. Apparently, many householders followed Japanese disaster prevention instructions which strongly advise that the gas should be turned off in the event of any sudden emergency.

Community records indicated that a total of 152,401 persons in Niigata city alone were directly affected by either the earthquake, floods, and/or fires. That

is, they suffered some property loss as a result of the threefold nature of the disaster. Apart from the victims who sought shelter with friends and relatives, over 24,000 other evacuees were housed in eighteen refugee centers. In the first two days more than 150,000 meals were provided daily by the public authorities.

Although the destruction was extensive, only 11 persons were killed and but 120 injured in the city of Niigata itself. (In the rest of the prefecture, 97,399 others were directly involved, three of whom were killed and an additional 216 injured.) For several days after the earthquake, there was concern over the possibility of a widespread dysentery epidemic. However, there were only thirteen cases identified, with the last case being reported on June 25, nine days after the earthquake.

II

The DRC first heard of the disaster on Tuesday morning, June 16 (Eastern Standard time), and sent three staff members to Japan on June 17. They arrived at midnight, June 18, Tokyo time and completed their field work in ten days. Two basic factors affected the response to this disaster and consequently the operations of the DRC team. As in most other countries in the world, the governmental structure of Japan is highly centralized. Local and prefectural units (the prefecture being somewhat similar to an American state) are closely linked and directly responsible to national agencies and ministries in the capital city. Thus, much of the organizational response to any widespread disaster in Japan occurs in Tokyo.

Secondly, Japan has undergone many disasters. For instance, in the period from 1951 to 1961 alone, more than 13,700 persons were killed, 364,300 houses destroyed, and 5,691,000 homes were flooded in eleven major floods and typhoons.

These experiences have led to the development of elaborate disaster plans at the national and prefectural levels.

In view of these facts, the DRC divided its research efforts between the organizational response in the central agencies at the national level in Tokyo and in the prefectural groups in Niigata. Less attention was paid to the local organizations in the city of Niigata. Interviews were conducted with forty four officials in the groups studied.

Interviewing in cultures other than those of which the researcher is a member normally presents a number of problems. Usually among the most serious are problems of obtaining cooperation and of meaningful communication. Only the latter created any real difficulty in this study in Japan.

Getting cooperation was simple. The DRC team obtained entry into most organizations either by way of the Disaster Control Center in the Prime Minister's Office or through the foreign liaison office of the Japan Self Defense Forces. Contact with the latter in turn was developed through the Military Assistance Advisory Group of the United States military forces in Japan. Entry by way of high officials in those two Japanese groups elicited a high degree of cooperation from other agencies both in Tokyo and Niigata. This was manifested not only in the generous amounts of time granted for interviews, but in the ready provision of whatever organizational logs and records were available, and in the later transmission to the DRC of such operational critiques as were conducted by different Japanese groups.

Meaningful communication was more of a problem. When interpreters could engage in almost simultaneous translation, the exactness and the flow of the questions, probes, and answers was apparent. However, when interpreters with

less skill were used, it was clear that communication was not always adequate.

This difficulty was very evident, especially in retrospect when interpreters paraphrased or summarized instead of attempting a full literal translation of all that was said. Two ameliorating factors in this study were: (1) many Japanese officials, particularly in the upper hierarchies of the national agencies, spoke English; and (2) since almost all interviews were tape recorded, it was possible to have them reinterpreted when the recordings were brought back to the DRC.¹

In Tokyo formal interviews were obtained from officials in the following organizations:

- Cabinet Secretariat in the Prime Minister's Office
- Ministry of Posts and Telecommunications
- National Police Agency
- Ministry of Transportation
- Ministry of Health and Welfare
- National Fire Service Agency
- Tokyo Metropolitan Fire Department
- Ministry of Trade and Industry
- Ministry of Construction
- Disaster Command Post of the Japan Self-Defense Forces
- National Research Center for Disaster Prevention
- Disaster Command Post of the Eastern Army
- Meteorological Bureau
- Japan Red Cross
- NHK (The governmental radio and television network)

In Niigata formal interviews were obtained with the following officials:

- Governor, Niigata Prefecture
- Commanding General, 12th Division, Eastern Army
- Major, Officer of Day, June 16th, 12th Division
- Disaster Control Section, Niigata Prefecture:
 - Disaster Coordinator
 - Public Information Officer
 - Section Chiefs:
 - Welfare
 - Medical
 - Commerce and Industry
 - Agriculture Division
 - Agricultural Land Division
 - Forestry

Civil Engineer
Education
Public Safety:
Police
Fire

Niigata City:

Chief of General Affairs
Secretary to Mayor
City Water Department
Administrator-Physician, Local Hospital.

A community normally copes with a disaster by bringing crucial resources to bear and by solving key functional problems. These resources can be subdivided into: (a) plans (b) equipment and facilities and (c) personnel. Among the key functions that have to be handled are those of communication, authority and coordination. The following discussion is organized around a series of comments on the use of the aforementioned resources and a set of observations about such community problems in the Niigata earthquake disaster.

The greatest attention is given to the operations of organizations in the immediate emergency period, i. e., the three or four days after the earthquake. Comments about the collective responses at the national level, where appropriate, have been separated from remarks which essentially relate to groups at the prefectural and local community levels. In passing, a few comparisons are made with organizational responses in other disasters, especially the Alaskan earthquake of 1964.²

III

RESOURCES

A. PLANS

1. An elaborate multi-level disaster plan existed.

There is considerable variation within American society insofar as planning

for disasters is concerned. Alaska, as was demonstrated in the recent earthquake, had prepared few plans for coping with a peacetime disaster. Texas, on the other hand, has detailed plans for eventualities in many natural disasters. However, just as there are major differences between American communities and states in disaster planning, there are also wide and general societal differences. Japan, as contrasted to the United States, is highly organized and prepared for disasters.

In 1961, the government of Japan passed a Fundamental Law of Countermeasures Against Calamities. The provisions of the law elaborate the organizational activities required for: (a) disaster prevention, (b) emergency measures, and (c) permanent rehabilitation and reconstruction. For disaster prevention the law created a national counter-disaster council in Tokyo and counterpart councils in each of the prefectures. Each participating governmental unit is required to develop ways to implement the plan and to report the methods to the Japanese Diet at the time of the annual budget appropriations. For emergency measures the law provides for the post-disaster formation of a Disaster Control Center in the Prime Minister's Office in Tokyo. This Control Center, headed by a State Minister, has the responsibility for coordinating the work of the affected ministries and other governmental agencies. Permanent rehabilitation is the responsibility of each ministry.

Therefore, on paper at least, when the Niigata earthquake occurred there was an elaborate mechanism for guiding group reactions to the disaster. The lines of action within and between organizations did not have to be charted. A framework for immediate response existed.

Generally speaking, the multi-level disaster plan was used. In gross terms, there was little major organizational innovation. As called for by the plan, a

Disaster Control Center was established in Tokyo by 5 p.m. on the day of the earthquake. A counterdisaster headquarters under the chief of the Fire Service Agency was set up in Niigata also on the afternoon of the catastrophe. Organizations mobilized and operated within the general framework of the master design.

Several officials, especially in the offices in Tokyo, noted that the plan seemed to be based on some vulnerable assumptions which were not tested in this particular crisis. For example, it was assumed that Tokyo itself and especially key agency personnel in the city would not sustain major loss in a disaster. Apparently these officials did not feel there was enough planned provisions for the substitution of personnel in the event certain important personages in the capital city were incapacitated.

2. The disaster plan was operative at all levels.

Disaster planning frequently exists only on paper. This is not the case in Japan. There appeared to be widespread knowledge about the disaster plan among personnel in the national organizations. Copies of the disaster manual were readily available even in those governmental offices and agencies not directly involved in this particular catastrophe. Booklets embodying details of the master plan seemingly were widely distributed and understood by those groups, both in Niigata Prefecture and Niigata City, that had assigned responsibilities in an emergency. In addition, as required by the prevention sections of the law, public information materials concerning precautions to be taken during particular types of disaster were well disseminated to the mass media and to village officials in the stricken area.

While the plan was certainly operative in the sense of being widely known

among all organizations, a few officials in Tokyo pointed out that particularly at the local level, "dry runs" of anticipated operations had not always been conducted. These officials seemed to think this may have negatively affected the responses of some of the community agencies after the earthquake. There is some evidence to suggest that the plan at all levels was better known than practiced.

3. The master plan had been activated only once before.

Groups at times prepare for eventualities that never occur. They may, as was the case in Alaska, also have little experience in dealing with certain kinds of crisis-occasioned problems. Neither of these two possibilities prevailed in Japan, but still the disaster plan had been little tested. While widespread emergencies are very frequent, the Japanese had only recently innovated overall and systematic planning to cope with large scale disasters.

Thus, the master plan had been put into effect only once before. This occurred in January 1963 when heavy snows killed 376 people in the very same Niigata region that was later hit by the earthquake. Selected aspects of the master plan had undoubtedly been used in localized train wrecks and mine disasters, but such emergencies do not require the involvement of groups beyond the prefectural level. Consequently, Japanese agencies particularly at the national level had had little actual experience with what their disaster planners had designed.

A few local community personnel commented that the previous experience had facilitated a more coordinated operation after the earthquake. However, officials in national organizations failed to note that they had previously used the master plan in a different context. Overall, there was no clear evidence that previous use of planned responses in a rather different kind of disaster had major explicit consequences for organizational responses in this earthquake catastrophe.

4. The master plan specified an organizational division of labor.

There was a clear-cut spelling out of the division of labor among all groups that would be involved if the plan were activated. This kind of specification applied to all organizational activity, whether it was at the national, prefectural or local community level. The master design not only defined the scope of activity for various agencies of the government, but also for public utilities, private railway companies and other private organizations.

For example, in the particular plan for Niigata Prefecture, the following responsibilities of organizations are delineated. The Kanto District Office of Finance is to direct the banking facilities in a disaster. The Niigata Office of Provision is to release rice in storage and distribute it. The securing of loans for "stricken" people in commerce, industry and mining is to be undertaken by the Ministry of Trade and Industry. The Niigata Land Transportation Office is to secure means of transportation, such as local railways and motor vehicles and to coordinate with the National Railways. Those sections of the Shinano and Agano Rivers under the jurisdiction of the Hokuiku District Construction Office are to be protected by that agency. The Government Monopoly Corporation is to distribute salt and tobacco in the stricken area. The Highway Construction Corporation has the responsibility of maintaining and repairing the Funabashi section of the Niigata Prefectural Highway, which is a toll road, and is given the authority to exempt emergency vehicles from tolls. Medical relief teams are to be provided and the collection and distribution of relief goods and money are to be undertaken by the Red Cross. The master plan specifies the scope of activities of many other organizations, but makes it clear that all are subject to the authority of the Governor.

After the earthquake, the organizational division of labor specified by the plan

was very well maintained. There were only some minor exceptions to the pre-designated patterns. For example, the Japan Self Defense Forces did engage in traffic control--presumably a police function--in a few sections of Niigata where large numbers of their forces were employed. Agencies generally did not undertake activities unspecified by the plan although, as will be illustrated later, a few prefectural groups had to expand their designated operations to assist hard pressed local agencies.

Emergency planning in American society does not always specify a clear division of labor among participating organizations. This is particularly true if public agencies and private groups are both involved. Organizations in an actual disaster frequently engage in duplicating and overlapping activities. The situation that ensued after the Alaskan earthquake with multiple groups engaging in multiple and similar tasks, is typical of domestic disasters and is in rather stark contrast to what could be observed at Niigata.

5. The plan was detailed.

Attention has sometime been called to the fact that existing disaster plans of American communities are often very general in their directions. Frequently they do not take into account the possibility of different kinds of emergencies. Even less seldom do overall plans incorporate master lists of locations of potentially needed supplies and equipment. All this contrasts with the preparations for crises in Japan.

Besides specifying what tasks each organization should undertake, the Japanese disaster plan also explicitly details how the activities are to be carried out. The detailed operational plans at the national and prefectural levels encompass such matters as the organizational means to be used in issuing and relaying disaster

warnings and alarms; how information is to be collected and dispatched; how disaster drills are to be conducted; and the measures to be taken prior to, during, and after an emergency in order to minimize damage. For example, the plan for Niigata states that in the event of certain potential threats, the Meteorological Observatory in the prefecture is to warn Prefectural Headquarters for Disaster Prevention, the police, the division of marine safety, the telephone and telegraph bureaus, the broadcasting stations, press, and public utilities. In turn, each of these agencies is to alert others. For instance, the Prefectural Police Office is to notify city, town, and village police stations by the use of a simultaneous telephone communication system. Finally, officials in each of these organizations are to notify the general public by explicitly specified means.

The general plan also contains provisions adapting it to the unique features of various types of disasters. For instance, while general instructions are given concerning the procedures to be used in warnings, modifications to be employed in the instance of tidal waves or floods are also detailed. The Meteorological Agency actually distinguishes between "tidal waves" emanating from earthquakes and those from other sources, and has a different warning system for each.

Besides detailing procedures, the disaster plan also elaborately indicated what kind of supplies and equipment might be required in different types of disasters, and how and where organizations could obtain such material. Thus, the Niigata Prefecture had a detailed 106 page printed booklet giving a comprehensive list of where, how, and from whom such material might be procured during an emergency. The booklet contained information on the location of construction and fire fighting equipment, filtering machines and water tanks for emergency distribution of water, and the location of chemical and medical supplies for sanitation. It indicated the terminals of taxicab and bus companies and the number of their vehicles, as well as

listing trucking firms and owners of motor, sail, river and small boats. Also indicated were the locations of all hospitals, where Prefectural Red Cross rescue teams could be found, the places of storage of directories of mass media facilities, and maps of the long distance telephone lines used by the police, the railway corporations and the Tokyo Electric Corporation. The booklet contained information for each city in the prefecture, on its consumption of meats and eggs, the daily stock available as well as the capacity of each city to produce these commodities. Every distributor and wholesaler for salt, vegetables and fruits, meat, eggs, dairy products and feed was listed along with the governmental storage areas for rice and grain. The locations of cooking facilities in various schools were specified; also where clothing and other necessities were stockpiled.

In general, most organizations made considerable use of the details of the plan in their operations. Some aspects, such as pre-impact warnings were, of course, irrelevant to this particular disaster, although the post-quake tsunami warnings generally were issued according to the planned procedures. In a few instances, there was deviation from the predesignated pattern. Thus, the local plan stated that the authorities were to designate refugee centers. As will be illustrated later, the reverse happened--the places where evacuees congregated were designated refugee centers. In the main, however, the detailed nature of the plan was not only followed but proved highly useful. Particularly extensive use was made of the lists of materials available. Without such a list it is improbable that nearly several hundred desperately needed water tank trucks could have been assembled as quickly as they were from within Niigata Prefecture as well as from other prefectures and from as far away as Tokyo and Osaka.

Still, as detailed as the plan is, a few items eventually required were not on the

list. For example, a certain antibiotic medicine to be used if there was a threat of dysentery was on the list. However, when cases of dysentery started to appear, the responsible health officials reconsidered the probable effectiveness of the designated medicine and decided to use another kind. Apparently this medicine had not been stockpiled and had to be specially purchased at a cost of over \$55,000.

B. EQUIPMENT AND FACILITIES

1. Certain key facilities remained useable.

All facilities are seldom destroyed in a disaster, but equally rare is the disaster in which all escape undamaged. However, the extent to which key facilities are impaired in some way is perhaps as important in affecting group responses to disaster as the degree of destruction. Thus, in the Alaskan earthquake, both the State CD and the Anchorage Public Safety buildings escaped relatively unscathed and became the foci of emergency responses and organizational effort.

A somewhat parallel situation developed in Niigata. Despite the very extensive property destruction and damage, two important public buildings, the City Hall and the Prefectural Headquarters with its annex, suffered only minor damage. Although neither building had any power or water at first, they could be and were used as offices and headquarters. Most of the initial meetings and decisions regarding emergency organizational activities took place in these two centers. The emergency counterdisaster control center of the prefecture was established in the Prefectural Headquarters.

That most schools also suffered little damage contributed materially to the operational efficiency of organizational responses. The school buildings were used for various purposes; nine schools were used to house refugees, nine other buildings

were occupied by 2,277 men from the Self Defense Forces engaged in emergency operations, relief goods were stored in three other schools, and six more school buildings were used to house 531 workers brought in from outside the city to assist in the rehabilitation and reconstruction work.

2. Convergence determined the location of many facilities for handling refugees and other disaster problems.

Typically, in disasters within the United States, governmental agencies or the Red Cross survey public buildings near the impact area and designate some of them as shelters for refugees. These buildings are chosen because their facilities are considered relatively adequate for the task. Refugees are gathered from wherever they may have happened to congregate and sent to the designated shelters.

In this Japanese disaster shelter facilities were, in one sense, "chosen" by the refugees. Forced to leave their uninhabitable homes, victims converged on well-known localities--primarily schools, hospitals and shrines. When a substantial number of victims concentrated around any such building, the authorities designated the structure as a refugee center. This was not the procedure detailed in the local disaster plan. Thirteen such buildings, ranging from an elementary school housing 2570 refugees to a small hotel holding 23, were still being utilized in this capacity nine days after the earthquake.

Various services besides housing were provided at these centers. For instance, the Medical Section of the Prefectural Government established a medical station at each one of the centers, manned both by Red Cross and prefectural medical personnel. These stations treated over five hundred minor health and injury cases daily. In addition, they served in part as the centers from which preventive medicine for dysentery was eventually distributed to 299,506 city dwellers.

The Medical Section of the Prefectural Public Sanitation Division also placed sixty-two trained workers at these centers to advise evacuees on problems involving evacuated infants.

3. There were differential demands on key facilities.

While certain facilities, such as communication are typically subjected to greatly increased useage in almost any disaster, it is also generally true that seldor are equivalent demands placed upon all key community facilities. In Anchorage, Alaska there were only a few minor fires as a result of the earthquake and consequent little need for much activity on the part of the fire department. In Niigata, as is typical in large scale emergencies there were substantial differences in the disaster-occasioned demands on key facilities.

Thus, the relatively low number of casualties placed little strain on the medical facilities of the seven general hospitals in the city. While all hospitals had difficulties in operating without utilities and some had problems as a result of housing refugees, none had to deal with a great increase in demands for medical services. One hospital with a 391 bed capacity, for instance, at one point housed over seven hundred refugees (and ten days after the earthquake it still had three hundred), but it was not burdened by any influx of medical cases.

On the other hand, the fire fighting facilities of the city were very badly strained. While Niigata was able to muster 2,635 men and twenty two chemical foam and pump trucks, this was not enough for the major oil fire which flared up twice. Control of this blaze required the use of types of fire extinguishers and equipment not available in large quantity in the Niigata area. Requests had to be made to the Tokyo fire department and various oil companies outside the Prefecture to dispatch specialized equipment. These groups eventually sent forty chemical foam and pump truck

as well as dozens of chemical fire extinguishers. Likewise, over 110, 538 liters of chemical foam had to be brought into the city, in part by U. S. Air Force planes.

4. Some disrupted facilities were more difficult to restore or to find substitutions for than others.

In a disaster, different facilities may undergo varying degrees of damage. Clearly the amount of damage suffered, linked as it is to remaining capabilities, is one major factor in determining how much of a problem is generated. However, apart from this, there can be roughly comparable damage to two facilities and yet considerable variation in how well and quickly the ensuing problem can be handled.

At Niigata most major facilities were damaged in some way, but a few were almost completely destroyed or put out of commission. For example, the city water distribution system, which normally provided 100, 000 tons (the measure used in official reports) of water daily, was totally disrupted. Likewise, the damage to the public utilities made cooking all but impossible. No gas at all was available for the first two days, and only ten percent of the service was restored at the end of the first week.

Distributing water proved a very troublesome problem. Only one water tank truck was available initially. When ninety-six trucks loaded with ten drums each were pressed into service the evening of the disaster, damaged roads made their movement difficult. The drums (some of them empty sake containers obtained from beverage concerns) were cumbersome and unwieldy and made pouring into the smaller receptacles being used by thirsty citizens, a very inconvenient and slow process. Official records show that it was near midnight before the first water was distributed; that night only 785 tons were supplied, a tiny fraction of the normal daily water useage in the city.

The next day the city requested up to an additional one hundred tanks, but the national agencies provided only thirty. Likewise, no more than 180 trucks were ever available. The third day after the earthquake, only 8,354 tons of water were distributed via these means. Attempts at restoration of the regular water distribution system proceeded slowly and encountered many difficulties; it was noon on the 20th before any water was being supplied through the system. As late as ten days following the disaster, less than one-third of the population was receiving water through normal channels. Practically all organizations singled out supplying water to the city inhabitants as the major post-disaster problem.

Feeding victims did not prove as troublesome a problem. There was never any shortage of food. The night of the disaster, nine branch offices of the city administration all located in a rural area, were given the responsibility of preparing food for the evacuees in the thirteen refugee centers. Around 11,000 meals were provided between 10 p.m. and 11 p.m. that first night.

Officials in the Agricultural Economic Bureau of the prefecture realized on the morning of the 17th that the useable rice supply would be quickly exhausted. They, therefore, asked Tokyo for help; the same evening, nearby Gumma Prefecture sent in forty-eight tons of polished rice. This was supplemented by provisions brought in by ships of the Maritime Self Defense Forces and by food donated by the Ground Self Defense Forces. This food was turned over to the branch offices. They, in turn, not having adequate cooking facilities, assigned neighboring farmers the responsibility of preparing rice balls for from twenty to thirty persons each. When the farmers had cooked the food, it was then collected at the branch offices, and later transported by cooperatives and farmers' organizations to the refugee centers. More than 150,000 meals were provided for disaster victims the first

several days after the earthquake. The almost exclusively rice diet evoked occasional comments from a few refugees and there were complaints that infants two years or younger became ill from being fed cold, hard boiled rice balls. In the main, however, there was neither a shortage nor any major difficulties in the distribution and preparation of food in contrast to the shortage and distribution problems that arose in connection with the water supply.

5. Extra-community organizations provided specialized equipment and additional materials mostly in the later phases of the immediate emergency period.

The cornucopia notion has been fairly widely documented insofar as disasters in American society are concerned.³ Following a disaster a mass of assistance comes from outside zones into the impacted area. Organizations of all kinds provide a vast array of supplies both for affected groups and for their own emergency and relief operations in the disaster area. However, it usually takes some time before material can be assembled and sent. This also happened at Niigata.

As already indicated, fire extinguishers, chemical foam, and food supplies were brought in by land, sea, and air from all over Japan. A variety of other materials was dispatched, ranging from the 107 trucks provided by the Japan Express Company of Tokyo to the 20,000 vitamin pills sent by the Ministry of Posts and Telecommunications for its own personnel, to the 1489 pairs of rubber slippers obtained by the Niigata Welfare Department. However, most such resources did not become immediately available. In the first twelve hours or so of the post-impact period, Niigata had to depend mainly on whatever equipment and material was available in the city or nearby rural areas. The first fire equipment from outside the disaster area did not get to Niigata till 9 a.m. the next day, twenty hours after the earthquake. The Japan Red Cross did not get any supplies into the area until

11 a.m. on June 17. And while many national ministries had representatives on the disaster scene a few hours after impact, almost none of these organizations moved in any material until the next day, at the earliest.

C. PERSONNEL

1. Almost all organizations had their normal work complements on hand at the time of impact.

The vast majority of organizations follow some sort of work cycle. This means that a disaster may occur when an organization has all of its personnel directly available, or when practically none of them are at the work scene. In the latter case, the mobilization of a complex group cannot occur immediately; some time must necessarily pass before organization members can assemble and start carrying out their work tasks. In the Alaskan earthquake, for instance, many organizations could not respond immediately because the disaster occurred on a weekday after 5:30 p.m. when most workers were on their way home from work, or were already home.

In Niigata, however, the earthquake happened early in the afternoon on a normal working day. Almost all organizations, therefore, had their full complement of personnel on hand. There was no problem of alerting workers or waiting for them to assemble.

2. Overall, there was no shortage of personnel.

Usually there is no shortage of workers for the tasks that need to be done during the emergency period in disasters in America. In large part, this is due to the great number of volunteer workers available. In combination with the personnel of the extra-community organizations that move in, they make up a manpower pool quantitatively if not qualitatively adequate for the requirements of the emergency

period.

There was no shortage of labor in this disaster either. However, this did not result from the appearance and use of volunteers. The DRC team found only two instances where volunteer workers were employed by organizations: The Japan Red Cross used some volunteers and a score of university students assisted Self Defense Forces personnel in repairing water lines and in filling sandbags.

Japanese organizations normally seem to be manned in depth. An impressionistic observation is that there seems to be an abundance of manpower at practically any level of a Japanese organization. For instance, the city of Niigata alone had over 1,000 policemen (as compared, for example, with 570 policemen in Columbus, Ohio, a city more than 50 percent larger than Niigata). Since both the organizations on the scene, and those that moved in from the outside were not suffering a labor shortage, there were enough persons to take on the number of tasks increased or created by this disaster.

Furthermore, there was no shortage of personnel because of the ready back-up manpower pool provided by the Japan Self Defense Forces. The Ground Self Defense Forces, which contributed 6,500 men from two different divisions as well as an engineering brigade, had 7,300 men in immediate reserve. A squad of soldiers moved into Niigata at 3 p.m., although the bulk of the troops employed did not get into the city until the next day. They and the other Ground Self Defense Forces personnel who followed worked primarily at building dykes, repairing roads and railways, restoring pipe lines, and in helping to purify and distribute water. The Maritime Self Defense Forces provided 18 ships and an additional 1,601 men to transport sandbags, to help clear the harbor of debris, and to make reconnaissances of the off shore islands. The Air Self Defense Forces sent at

least 150 men and several helicopters.

The presence and use of military personnel is also rather typical of large scale disasters in American society. However, the general attitude towards the armed forces is rather different in the two societies. In Japan the very existence of a military organization was controversial during the early post-war period. While Self Defense Forces are involved in the national disaster plan, they are not assigned a central role but may act on their own initiative in local community disasters. In the United States there is much more positive orientation and an expectation that the armed forces will assist in major community disasters. Yet in both societies, as exemplified in Alaska and Niigata, military manpower was widely used to bolster the disaster operations of the civilian organizations.

3. The convergence of extra-community organizational personnel was relatively limited and selective.

Many researchers have called attention to the convergence of organizational personnel upon the impact area in disasters in American society.⁴ It often seems to be implied that the convergence of people from different groups is rather massive and that the participants engage in widely heterogeneous disaster related activities. This may be a correct picture of the typical situation in American domestic disasters.

However, at Niigata the convergence from outside the disaster area appeared to be relatively limited and fairly selective in nature. That is, local persons and Niigata-based prefectural personnel formed the core and in almost all instances the bulk of the organizational personnel engaged in any particular disaster-related activity. In all instances, the ratio of local to outside personnel engaged in earthquake occasioned tasks seemed very heavily weighted in favor of the former. The Prefectural Civil Engineering section in Niigata used hundreds of people, but

only 40 of these were from outside the area. The police force, badly handicapped because 526 men or nearly half of its personnel had sustained damage to their homes, nevertheless brought in only 160 extra patrolmen from 32 other police stations elsewhere in the prefecture. Only the Japan Red Cross, an atypical organization in some respects, depended heavily on extra-community personnel. Even the Self Defense Forces units, who in one sense are not community based, came primarily from bases near Niigata.

Furthermore, most of the personnel coming from outside Niigata tended to be specialists, technicians or persons in teams with special equipment. The Tokyo firemen with the chemical foam trucks have already been mentioned. The Red Cross sent in 61 relief groups composed of 201 persons, all people with prior and specialized training. Forty-nine water filtration technicians came in as teams from ten different localities outside the prefecture.

IV

FUNCTIONS

A. COMMUNICATION

1. The initial news of the disaster and its general magnitude was quickly communicated to almost all national organizations.

The earthquake was of sufficient intensity that it was felt throughout the 15 northern prefectures on the island of Honshu, including Tokyo where all national organizations have their headquarters. Still, since Japan is almost daily jarred by tremors, such earth movements in themselves would have not been judged as significant or indicative of a major catastrophe. However, the earthquake also coincided with a daily nationwide news telecast, and both the fact of the earthquake and its general location were announced before the end of the telecast at 1:15 p.m. Similar news was broadcast over the NHK radio network a few seconds

afterwards. By 1:25 both radio and television started to give and to repeat tidal wave warnings for a number of specific locations along the coast of Japan. On the 2 p. m. news, NHK radio added such details as which railroad lines were blocked, where oil fires had broken out, and that the earthquake was of 7.7 magnitude.

A few organizations in Tokyo obtained supplementary information about the disaster through their own sources. Thus, the National Telephone and Telegraph Corporation itself informed NHK at 1:15 p. m. that telephone service to Niigata was disrupted. Likewise, the national police headquarters in Tokyo obtained from Niigata some sketchy details through two somewhat erratically functioning police lines that had survived the earthquake.

However, almost all national organizations obtained most of their initial information and certainly the overall picture from NHK reports. Many of these groups are linked to the Meteorological Bureau for tsunami and typhoon warnings; however, the warning of tsunamis which they received on this occasion would have merely indicated that something on a fairly large scale had occurred somewhere. They still had to depend heavily on NHK for other than just an indication of a potential disaster.

The widespread dissemination of the general news about the earthquake within thirty minutes after its occurrence was not the result of any pre-disaster communication plan; rather it stemmed from the quickness of response of the electronic mass media, especially the NHK network. This in turn resulted from two facts. First, NHK in Tokyo had three connections with Niigata which continued to be operative for nearly twenty minutes after the earthquake hit. Second, the local radio station in Niigata managed to keep broadcasting and its transmissions were intercepted and monitored by more distant NHK stations which relayed the information to Tokyo. The existence of such contact contrasts with most other widespread community

disasters where the mass media usually learn only from secondary and indirect sources that a disaster has occurred, and where, consequently, it may take hours for even the general and verified information of such an occurrence to circulate to national organizations.

2. Many national organizations, because of limited direct communication in and from the impacted area, initially had little detailed information and could not fully mobilize.

While almost all national agencies quickly learned of the disaster, very few obtained adequate enough details by which to judge how and in what way they could operate in the stricken locality. That is, after the initial news of the disaster, added details were not readily available or they were not of the kind that were useful to organizations in deciding whether or not they might be needed in Niigata. In a sense, many national groups were alerted, but because of the lack of detailed information useful to them, could not fully mobilize.

For instance, the Japan Red Cross quickly notified its units in the Tokyo area. However, it was unable to obtain much detailed information which would clarify to what extent the assistance that the Red Cross was prepared to render might be required. (In fact, although it had a direct line to the Tokyo Meteorological Bureau, the Red Cross, for some unexplained reason, was unable even to learn of the exact location of the epicenter of the earthquake for almost two hours.) The National Fire Agency was not much more successful in obtaining additional details. Ten hours after the earthquake it still had not ascertained whether the fire fighting personnel and equipment dispatched from Tokyo to the impact area was really needed. (Seven chemical foam trucks were sent out at 7:30 p. m. not because it was known that they could be used against the raging oil fires, but simply on the

general principle that if the disaster was as great as it appeared to be, it was safer to err on the side of dispatching some units than to withhold all of them until detailed information was obtained.)

Likewise, some of the ministries seemed to be aware only that a disaster of some magnitude had occurred in Niigata Prefecture, but knew little more that might bear on their own operations.

Some of the national organizations that were alerted but not fully mobilized proceeded to try alternative means to obtain more detailed information. For example, the Red Cross, after failing to obtain information from the Tokyo Meteorological Bureau, unsuccessfully tried to phone the Niigata area. At 1:40 p. m., officials of the relief agency contacted the Federation of Amateur Radio Operators who operate a radio room on a volunteer basis at the Tokyo headquarters of the Red Cross. This room opened at 2:40 p. m. and made continuous attempts to contact Niigata. At around 2 p. m. the Red Cross Flying Corps had been activated, so at 3:30 p. m. the Director of Social Affairs flew to the impact area in an effort to find out more about the situation. The ham radio operators established contact with Niigata at about 4 p. m., although it was not until midnight that the Red Cross had an adequate detailed picture of the extent of the damage. Actually it was not until the following morning when the Director of Social Affairs flew back to Tokyo that this organization had enough relevant information with which to assess specifically what it needed to do in this disaster.

After disasters it is typical for extra-community organizations to have problems in quickly obtaining salient details about an impacted area. If anything, the situation that developed in Niigata shows that existence of some communication per se is not enough to insure that appropriate information will be circulated. In fact,

as indicated in the next observation, the problem in some respects may possibly be compounded when limited contacts do exist.

3. A heavy overload with consequent major delays occurred on the few direct communication channels that remained available between some national organizations and the stricken local community.

The earthquake damaged all 1,725 long distance telephone circuits into Niigata, but partial although erratic connections were maintained in thirty of them. Two of the functioning circuits happened to be the regular lines of the national police connecting Niigata and central headquarters in Tokyo. The police in Niigata got through with the first call at about 1:30 p. m., but communication over the lines in operation was rather unclear and undependable.

Nevertheless, an immediate overload was created on these lines (including one that was regularly used by the National Railway Corporation), since many agencies both within Niigata and outside attempted to relay information and ask about supplies. For instance, the National Fire Agency in Tokyo was unable to use the police line into Niigata until some time around midnight. Some of the national organizations also encountered long delays before they could get any information through the partially functioning lines. The Ministry of Health and Welfare, with major responsibilities after a disaster for the water supply, public health and medical measures, the housing and feeding of refugees, and garbage and refuse disposal, was one of the organizations that attempted to use the police lines. They sent a representative over to the national police headquarters in Tokyo, but it proved a very unsatisfactory and slow way of getting information.

It is unusual in a disaster of major magnitude for organizations outside the impact zone to have direct contact with the stricken area during the immediate emergency period. In this disaster, such a link -- although somewhat tenuous -- did

exist. However, the convergence on the existing connection with consequent long delays for all made it of limited usefulness for any specific organization. While some information was obtained that otherwise might not have been collected, no organization could have guided its operations primarily on the basis of what was gotten through the functioning lines. There was not enough being communicated that way. In fact, knowledge of the existence of the telephone lines may have somewhat delayed a few organizations in seeking other means of obtaining information.

4. Organizations eventually depended on obtaining most information necessary for their operations from their own representatives at the disaster scene.

In part because of the early difficulties in obtaining detailed information, but mostly because disaster plans called for such action, many national organizations sent personnel to survey the situation in Niigata as quickly as possible. For example, five members of the Ministry of Health and Welfare including the Minister himself flew to Niigata via U. S. helicopter the morning of the 17th. The same morning the Ministry of Transportation similarly sent more than a dozen representatives from the Harbor, Air Transport, and Railway Divisions, and the Maritime Police. The Ministry of Construction actually had seven staff members on the way to Niigata the afternoon of the earthquake.

The groups sent usually undertook very comprehensive kinds of surveys, covering not only what their organizations might have to do in the immediate emergency period, but also what might be required over a longer time period. The same procedure was followed by groups at the prefectural level. For example, two five-man teams were dispatched from Niigata by the Agricultural Division on the morning of the 17th to make a damage survey of agricultural lands in the prefecture. They worked on the 17th and 18th and, on the basis of their preliminary report, the

Division had a meeting on the 19th to set policy. Since it was determined that 18 of the 44 Agricultural Technical Improvement Centers within the Prefecture were damaged, staff members were dispatched to these damaged centers. After these staff members returned with additional information, a thirty-man fact-finding team was formed to make a final survey. In this survey, not only was there a classification made of the nature of the damage (e. g., levees broken, fields flooded, pumps destroyed, etc.) but also an estimate of the requirements for repair (e. g., farmer can repair, need help from Prefectural Government, no hope for repair and loss of crop, etc.). By the 24th this information was complete. These tasks were accomplished even though these activities did not have the highest priority since various personnel from the Division had to help at other tasks such as escorting water supply tanks to their destination.

While there is a tendency in most disasters for many organizations to send representatives to the impact site, the Japanese agencies in this crisis seemed to have moved more rapidly and to have compiled far more detailed information than is usually the case, at least in American disasters. For instance, organizations in general in the Alaskan earthquake assembled far fewer records and took longer in doing so. In Japan, ten days after the earthquake, every major agency had completed a comprehensive damage survey. This did not happen in Alaska.

Again, in part, the organizational response in Niigata can be attributed to the requirements of the disaster plans the Japanese groups were following. However, in part, it may be simply a result of the cultural difference between Japanese and American society insofar as record keeping is concerned. Also, the highly centralized nature of governmental agencies in Japan undoubtedly affected the emphasis placed on the obtaining of details and the comprehensiveness of the information

sought.

5. The initial internal communication activity of local organizations depended heavily on emergency means and makeshift procedures.

Within Niigata, the loss of electric power blocked out most of the usual communication channels. In addition, the means of communication as such were frequently destroyed or damaged. All telegraph systems, and 20,243 out of 22,243 telephone circuits, were put out of commission by the earthquake. Thus, local organizations had to devise new ways or activate standby resources for communicating with their own members and subunits during the emergency period.

For instance, the fire department shifted to an alternative power source, but it took an hour and a half to make the transition. Units out fighting fires initially could maintain contact only with their headquarters via messengers. The police within an hour were able to shift to battery and then to generator sources of power and, thus, were able to operate their main communication system with only a slight interruption. However, the police department headquarters lost both telephone and radio communication with the damaged substations and had to locate radio-equipped patrol cars at those sites. (In the undamaged substations communication was maintained via regular VHF radios.) The Prefectural Disaster Headquarters tried to set up its mobile radio unit only to discover that the generator was in the process of being repaired. There was a three hour delay until a substitute generator was finally obtained from the police. During this time interval, the headquarters had to have its personnel go to the main police radio to obtain information and dispatch messages.

The pattern of the initial internal communication activity of the local organizations in Niigata was typically that seen in almost all disasters. There was the

usual mixture of partially planned and partially improvised attempts to communicate. The consequence, as is usually the case, was some delay and disruption of the receiving and sending of intraorganizational information, with a slow-down in the speed of the overall response to the emergency.

6. The various organizations initially used a combination of standard, stand-by and improvised means and procedures to communicate with the stricken population.

Organizations operating in disasters typically have difficulty during the immediate post-impact period in communicating with people in the disaster area. In American society great reliance is placed on informing victims through the mass media (almost exclusively radio). For example, in the Alaskan earthquake organizations informally, and not as a consequence of prior planning, contacted radio stations to transmit official announcements and messages.

In Niigata, a somewhat more complex and only partially planned way of communicating with the general populace developed. For instance, the police as standard equipment have transistorized loudspeakers which they use to issue warnings of impending typhoons and tsunamis. Officers following stand-by emergency procedures and using this equipment told people to evacuate areas where flooding was anticipated. Somewhat more improvised and unplanned were the activities of the public information officer of the Disaster Relief Headquarters. He borrowed two public information automobiles from the local fire department. From June 16 on, these cars daily drove through the city and made announcements such as where water could be obtained, where housing was available, what tax relief the government had decided upon for earthquake victims, where refugee centers were located, etc. (Two additional cars were sent from Tokyo and used for three days during the emergency period.)

Even more improvised were the operations of the local NHK radio and the local NHK TV station on June 16. The radio station continued to operate during and immediately after the earthquake although it reverted to local broadcasting since it was cut off from the national network transmissions until 8:30 that evening. However, the broadcasting studio, being on the east side of the city, was isolated from almost all the offices of the governmental agencies which were on the west side. (Telephone communication was out, and all the bridges across the river were for a time blocked to pedestrian or motor traffic.) Therefore, employees of the station simply made visual observations of the scene around them and reported these over the air. Eventually, the personnel manning the mobile radio car of the station (which had been parked on the west side at the time of the earthquake) placed it outside of the Prefectural Disaster Headquarters and sent information back to the station. The radio station also made announcements over the air on the basis of accounts sent in via five walkie-talkies being used by reporters scattered at different localities in the city where disaster related activities were occurring. The distances involved, however, were frequently beyond the capacities of the walkie-talkies so the news received about the activities of different organizations was erratic and an uneven flow of information was transmitted to the general public.

The local TV station was able to return to the air at 1:50 p. m. (and to link back in with the national network by 5:33 p. m.). While station personnel had little difficulty obtaining films of the destruction and ongoing activities, they were considerably handicapped by the water shortage in their attempts to develop the films. For a while the station had part of its office staff going out into the damaged areas and taking Polaroid camera shots at the scene. In general, the operations of the local TV station were geared more to getting information out to the national network

than it was in communicating locally, but the latter task was not completely ignored.

B. AUTHORITY

1. In general, the normal lines of authority and those specified in disaster plans were those operative in this crisis.

In large scale community disasters problems regarding lines of authority sometime arise. In American society such difficulties are frequently compounded by the relative autonomy of the different agencies of government and separate spheres of responsibility at the local, state, and national levels. For example, in the Alaskan earthquake it was not always clear to the organizations involved which state or which local agency had responsibility for certain disaster related activities in the city of Anchorage.

In Japan, as indicated earlier, the governmental structure is highly centralized and the chain of command from the national through the prefectural to the community level is normally quite clear. In addition, as was also previously mentioned, the elaborate disaster plans specify in very explicit terms which organization is responsible for what function at a time of crisis. In the Niigata earthquake disaster there was little deviation from the existing and stand-by authority relationships and spheres of responsibility.

Only in two instances was there any substantial shift of responsibility and an unplanned assumption of control. City agencies normally have responsibility for preventive public health measures. However, the Governor, observing that these organizations apparently were unable to carry out those functions, asked the Prefectural office to assume this responsibility. Under his order, around three hundred prefectural officials worked with other municipal and town officials and with about one hundred local medical personnel on the disinfection, diagnosis and prevention

of dysentery. In fact, an additional twenty to thirty other medical personnel were brought in from outside the prefecture. A somewhat similar shift in responsibility and unplanned assumption of control of activities occurred in connection with the provision and distribution of the water supply being brought into the city.

2. Authority problems were minimized since most organizations enlarged neither the type nor the scope of their activities.

A potential for a conflict of authority is sometime created when there is an overlap in group functions. This most often happens when organizations engage in multipurpose activities. In other words, when an organization performs many different functions, it is more likely to encroach on the activity of others. In disaster, this often comes about as the result of the enlargement of activities. For example, in the typical disaster in American society, the provision of shelter is not always seen as the sole responsibility of one organization. Consequently, several agencies often initially proceed to provide this service. Subsequently, questions of responsibility arise.

Japanese disaster plans, in large part, specify the continuation of traditional tasks from a pre-disaster to a disaster situation. Thus, in the Niigata earthquake organizations generally did not add new and different tasks but only intensified their "regular" activities. When the work load became too heavy, organizations operating at the disaster scene "borrowed" personnel from structurally similar organizations in other prefectures or from national headquarters. This allowed the pre-disaster structure of authority among existing organizations to remain the same while their capacity to function was increased to meet the new demands.

3. Authority problems were minimized because there were few emergent groups.

In the typical disaster in American society new groups sometimes emerge to undertake additional functions not pre-empted by existing agencies. For example, since no one usually has the official responsibility for immediate rescue, a new group often develops to perform this function. This happened in the Alaskan earthquake. Operating with no formal structure, guided by no traditional patterns, and frequently drawing personnel with widely heterogeneous backgrounds, such emergent groups often find themselves in conflict with established organizations over questions of authority and responsibility.

Such problems did not arise in Niigata. Most necessary functions seemed to be clearly pre-empted by existing organizations carrying out their traditional tasks. Few new informal groups appeared to have arisen, or if they did, seemingly were of little importance. (It is not beyond possibility that this impression is an artifact of the conditions under which the DRC team gathered its field data. The subtler and more informal aspects of emergent groups are difficult enough to discover in domestic disasters, and presumably would be doubly so in a different culture. However, to the extent there is any evidence, it supports the notion that few new groups handling additional tasks developed in the Niigata disaster.) The absence of such informal groups precluded clashes with established organizations over who had authority regarding the new functions.

4. Authority problems were also minimized because non-local organizations operating in the disaster were generally not multipurposed and were closely coordinated with community groups.

Authority problems are sometime created in disaster situations by the entry of non-local and multipurpose organizations. When operating in a local community, these "outside" agencies lack a tradition of cooperation and are unfamiliar with the usual patterns of authority and spheres of responsibility. Because of this, persons

in existing community organizations often feel such organizations encroach on their functions and do not recognize "existing" authority.

Many extra-community organizations had personnel working in Niigata. However, almost all of these organizations, as indicated earlier, carried out their traditional and relatively specific tasks. Furthermore, much of the actual work of even the national organizations was carried out by or in close cooperation with local officials. Thus, possible authority problems along these lines were minimized.

Perhaps the point can be more clearly made by contrasting the usual disaster operations of the Red Cross in Japan and in this country. When the American Red Cross moves into a disaster area, it often initiates a number of activities which it has found necessary in previous situations (and which it is required to undertake as stipulated in its national charter).

It may open shelters and provide facilities to feed refugees. It may act as a center for message transmittal as well as becoming heavily involved in medical activities. Long-range rehabilitation responsibilities may be initiated. Such multiple tasks often put the Red Cross into competition with other agencies performing similar functions. In the initiative for these activities comes from outside the community, this overlap of activities becomes complicated by the "threat" of the stranger trying to operate in "unfamiliar" territory. By contrast, the Japan Red Cross has a more specific and limited responsibility in disaster operations-- medical rescue activity. While it may bring rescue teams in later from outside the stricken area, immediate rescue work under its auspices is done by local physicians and nurses activated by local chapter officials or by village political officials who are branch Red Cross heads. This is what happened in Niigata. While the Japan Red Cross also became involved in the collection of donated money and goods, the

pattern of distribution was determined primarily by local welfare officials. The specificity and limited range of Red Cross functions in Japan contrasts sharply with the more diffuse character of the American Red Cross and, as such, in part seems to preclude the emergence of certain kinds of conflict in authority and spheres of responsibility often found in disaster operations in the United States.

5. Civilian authority was clearly maintained even though there was very heavy military involvement in disaster operations.

In American disasters questions of authority sometime arise over the role of military units on patrol and guard duty, as well as on the meaning of martial law. Soldiers frequently take over or assist in maintaining the security of a stricken area. Yet these forces and involved individuals and local officials in a disaster area often seem uncertain what authority if any military personnel have to block roads, prevent entry, "order" people away from a scene, etc. The lack of clarity regarding authority is often reflected in the confusion surrounding the regulations governing the pass system typically initiated after a disaster, and such as occurred in Anchorage, Alaska. Also, while military officers never make the mistake, some civilian officials and citizens at times assume that the presence of armed soldiers is an indication that martial law or some variation thereof is in effect; that civil authority has been at least temporarily suspended.

The military played an important role in the organizational response to the earthquake in Niigata. However, these forces were clearly always under the control of the civilian authorities and no question of greater responsibility seems to have arisen. The governor of the area, exercising his prerogative, requested that the commanding general of the local units dispatch some of his troops into the stricken area. Since the 30th Infantry Regiment of the 12th Division, the nearest

unit was out on maneuvers, the initial force sent the afternoon of the earthquake consisted only of a liaison officer and 60 men. Later more troops were dispatched. In all of their activity, the nearly 10,000 men from the Self Defense Forces played an adjunct role. That is, they helped other organizations in such matters as water distribution, fire fighting, sandbagging, etc. However, the security of the area never became a function of the military; it remained the task of the prefectural police. Likewise, the Self Defense Forces never exercised nor were they perceived as exercising any authority over others; they remained as all other organizations under the authority of the disaster headquarters.

The clear and subordinate position of the military in Japan at least in this disaster appeared to stem from three factors. Disaster planning in Japan has no provision for martial law, so no confusion over its possible application could arise. Second, the disaster plans at both the national and prefectural level specify civilian supremacy at both operational levels, although Self Defense Forces have representatives at the Disaster Headquarters. To the extent that plans are followed there can be little uncertainty about spheres of responsibility. Finally, the military in Japan seems to be very cautious and exercises a great deal of self restraint when undertaking tasks involving civilians.

6. There was no breakdown of formal authority over the general population.

There is a widespread belief manifested in much disaster planning that the reactions of victims in an impact area creates major problems of social control for organizations in their relations with the stricken population. Many people are

supposed to be either hysterical and panicky or so overwhelmed by the disaster as to be in a state of shock. (This is manifested in the "disaster syndrome.")⁵ In either case, if large masses of people reacted in these ways they would not be very amenable to the guidance of organizations and would seriously threaten the exercise of formal control by the authorities. However, as has been observed in innumerable domestic disasters, so few people react in such manners that organizations rarely have control problems arising from these factors.

This was also the situation at Niigata. There was no mass panic, large scale hysteria or much in the way of a manifestation of the "disaster syndrome." A few quarrels broke out among housewives waiting in line for the distribution of water. However, organizations in exercising formal control had no problems that stemmed from the reactions of victims as such.

In fact, as also has been observed frequently in American disasters, visible symbols of formal group affiliations were taken as signs of authority. Many organizations, including personnel of the Disaster Headquarters and the Self Defense Forces used makeshift arm bands while others, such as the Red Cross utilized familiar caps and helmets. In addition, private trucks being used in disaster operations often carried cloth banners indicating their mission. Such symbols seemed to be understood by the general population as empowering the personnel wearing them to engage in disaster relevant activities.

C. COORDINATION

1. Organizational coordination followed prearranged patterns. In many disasters in the United States, much of the seeming confusion stems from a lack of coordination of activities among various organizations. What official or agency has authority for different major decisions may be ambiguous. There may not be con-

sensus or agreement on the division of labor among different groups. Tasks may be attempted without adequately communicating about them to other organizations. Overall, there frequently is a coordination problem because there is no specific, pre-existent plan with a broad scope.

In the main, there was no such problem at Niigata. As already indicated, the disaster plan specified who had responsibility for certain tasks, what had to be done, and how the work was to be related to that of other organizations. For example, the Ministry of Transportation in Tokyo knew it alone had to decide whether highest priority should be placed on the repairing of the major railway trunk lines or on the restoration of the airport facilities. It decided on the former and coordinated the work of its local personnel, the 550 men it sent from Tokyo, and the personnel provided by the Self Defense Forces so that by June 19 a through rail line into Niigata had been rebuilt along with a temporary platform station. This Ministry also knew that among other tasks it had to clear the floating debris from the harbor, to examine the airport landing lights, and to accept and transport without cost, relief packages given by citizens to railway stations around the country. These tasks had to be coordinated with the different local organizations involved. Similarly the Ministry of Transportation coordinated the work of the local port authorities and the Maritime Self Defense Forces in remeasuring the water depth in different parts of the harbor. All these activities and more involving multiple organizations could be relatively easily coordinated because the prearranged patterns specified in the disaster plan were followed.

2. Coordination problems were minimized because most involved organizations had the same jurisdictional boundaries.

One persistent problem of coordination in disasters is the fact that the jurisdiction of organizations working together are often not consistent. In American

society, one agency will have local jurisdiction only while others will have national, regional, state or district scope. Thus, typically there are major differences between the operational boundaries of such groups as the public utilities, governmental agencies, and the Red Cross and the Salvation Army. In the Alaska earthquake, there were problems of coordination stemming from the various jurisdictional boundaries of such different organizations.

In Japan, organizational boundaries tend to be much more consistent. For one, almost all major groups-- the chief exception being fire departments-- are national in scope and have approximately the same regional subdivisions. This facilitates coordination between such organizations as it did in the instance of the national agencies participating in the Niigata earthquake. For example, the whole tsunami warning system essentially rests on the assumption that at every level, each of the participating groups has the same jurisdictional boundaries.

The prefectural government also provides a somewhat consistent locus for another system of coordination. Even non-governmental groups tend to be organized along prefectural lines. For example, each prefecture has a chapter of the Japan Red Cross. Such chapters are located in the prefectural capital and their jurisdiction is exactly the same as other prefectural organizations. Thus, in Niigata the local Red Cross chapter, because it was operating within the identical geographic area, was able to mesh its activities very well with other groups.

3. The absence of volunteers on a large scale lessened coordination problems.

It has frequently been observed in domestic disasters, that organizations often not only have to coordinate with other groups, but that they also have to integrate the efforts of numerous volunteers. These volunteers are usually untrained and not too susceptible to normal organizational controls. Thus, as happened in Alaska, agen-

cies utilizing such persons sometime find it difficult to coordinate the mass assault -- to use Barton's phrase-- with their more formal group efforts.⁶

In the main, this was not a problem at Niigata. As earlier noted, convergence behavior from outside the local community was of a selective sort, and very few volunteers were used. In one sense then there was no mass assault and thus no need of coordinating it with the more formalized and collective attempts to cope with the disaster.

4. Problems of coordination were facilitated by the centralization of organizational control activities.

In many disasters the most heavily involved organizations often find themselves operating out of different control points, frequently their old headquarters but sometimes a newly established one. Even key coordinating units may be functioning out of buildings relatively spatially distant. Multiple control points, while not completely dysfunctional, require the establishment of direct and quick communication if effective coordination is to be achieved. If as happened in Anchorage, Alaska, there is the additional complication that organizations have widely different jurisdictional boundaries, it may take some time before overall group coordination is achieved.

In Niigata, control of organizational activities was heavily concentrated in the two already aforementioned buildings. Most of the top officers of the local groups primarily involved in the disaster, practically every high official in the prefectural social structure, and all of the representatives from the national agencies, tended to work out from one or the other of these places. About the only important unit not operating from those localities were the radio and TV stations (although as indicated earlier, NHK quickly parked its radio car outside the Prefectural

Headquarters building). The centralization of decision-making activity, insofar as local community actions were concerned, facilitated the solving of such coordination problems that did arise.

V

Whatever implications for emergency operations planning might be drawn from the tentative observations stated in this report, could best be derived by more knowledgeable planners and administrators than ourselves. However, for what ever they are worth, we list here some impressions which might be considered in thinking about possible organizational preparations for crises. For the sake of brevity, the ideas are set forth in general and unqualified terms. These remarks, of course, just as all others in this preliminary report, may be modified on the basis of later and more systematic analyses of the data.

Plans

1. An overall plan integrating pre- and post- disaster planning with the emergency activities of all organizations, facilitates operational responses in crises. One master plan encompassing all time periods and all organizations seems better than many plans for different periods and multiple groups.

2. Plans exist only to the extent that they are widely known, understood and exercised. For practical purposes, a "paper plan" alone is no plan.

3. Limited experience with a disaster plan in one kind of emergency may have few direct consequences in another type of catastrophe. There is no necessary automatic carry-over from one crisis situation to another.

4. Master plans that clearly specify the collective division of labor appear to help in avoiding duplication, overlap or omission of crucial tasks. The work of all public and private groups likely to be involved must be made quite explicit beforehand.

in order to solve these problems.

5. In the quick activation of a master plan, specifications regarding disaster procedures are as important as details on locations of material stockpiles. Knowledge of emergency measures without information about the wherewithal, or vice versa, can substantially delay organizational mobilization.

Equipment and Facilities

1. The effectiveness of overall emergency responses may depend more on the post-disaster functioning of certain key installations than on the degree of impairment of facilities in general. Not all facilities are of equal importance in organizational operations in disaster situations.

2. Victims may determine the post-disaster foci of organizational activities. Provision must be made for this possibility and for consequent problems in the utilization of equipment and facilities.

3. Key community facilities are not all likely to be subject to the same degree of demand in the post-disaster situation. Some organizations will have to utilize their facilities much more fully than others.

4. In the aftermaths of a disaster, the rate of restoration for equivalently disrupted facilities can vary substantially. Some are more difficult to replace or substitute for than others.

5. Even under the best of circumstances and where plans have been made, there is necessarily some delay before extra-community assistance can arrive at a stricken locality. In the immediate emergency period, a community has to depend initially on whatever resources have locally survived.

Personnel

1. The time of a disaster has definite consequences for rapid organizational

response. Whether a full work force will or will not be immediately available seems, in part, to depend on the daily and weekly operational schedules of the involved organizations.

2. Volunteers are not necessary for the carrying out of crucial post-disaster tasks. Given certain kinds of organizational structures and/or the presence of available military manpower, it may be possible to dispense with volunteer workers.

3. Extra-community convergence behavior need not always be massive and indiscriminate. Both its quantity and quality can probably be controlled.

Communications

1. There can not be any large scale, organized reaction to a disaster without extensive exchange of information, both within the stricken community and between it and other areas. Lack of post-disaster communication may allow only individual and small groups responses at the local level.

2. Organizations apparently cannot mobilize fully on the basis of only general information about a disaster. They must have specific details which pertain to their own operations in the emergency.

3. Dependence on direct but limited communication links between the impact area and more distant points may delay organizational efforts to seek other information sources. Organizations which seek alternate channels of communication at once, will be able to mobilize more rapidly than groups attempting to depend solely on channels surviving from the pre-impact period.

4. The most detailed and the most accurate information is that which organizational representatives on the disaster scene can communicate back to their own headquarters. Groups who have their agents at the site seem to operate more effectively than those who rely on indirect sources of information.

5. Initial communications within local organizations involved in a disaster, appears to depend on both planned and improvised efforts. Such a mixture necessarily delays exchange of information and speed of group response.

6. If a great variety of means of communication is employed, official groups are more likely to be able to communicate with the general populace. In part, the number of different ways used seems to depend on the amount of improvisation organizational personnel feel constrained to attempt.

Authority

1. An overall centralized organizational structure allowing little autonomy to sub-units minimizes post-disaster authority problems. Something of the same consequence might be achieved by detailed disaster plans delegating specific emergency functions to specific emergency groups.

2. Limiting the tasks of organizations to traditional ones reduces authority conflicts. Development of new, or expansion of usual, group activities in a post-disaster situation, appears to lead to overlap of functions, with resulting confusion and dispute over areas of responsibility.

3. Emergent groups in a post-disaster period undertake new functions which are a source of clash over authority boundaries with established organizations. It is possible that the number of questions regarding shared or overlapping responsibility will be less, if the number of newly emergent post-disaster groups is less.

4. Authority conflicts will arise when multi-purposed, nonlocal organizations move into a disaster area to operate with community groups. Possible disputes may be minimized if local organizations keep to their traditional, limited tasks, and if nonlocal groups establish close operational ties with local officials.

5. Extensive activity on the part of military units in disaster operations does not necessarily challenge overall civilian control. If the civil organizations involved are aware of the limits of military assistance, the supremacy of civilian authority is generally implicit.

Coordination

1. Inadequate communication of information, lack of agreement over the division of labor, or ambiguity regarding lines of authority, hinders coordination of activities among organizations involved in emergency operations. A specific and overall pre-disaster plan apparently prevents such problems and allows an integrated group effort to cope with the crisis.
2. Coordination of emergency responses to disasters is difficult between organizations whose jurisdictional boundaries differ. The less the difference between the operational boundaries of various groups, the greater the overall coordination appears to be.
3. Considerable, time, effort, and resources seem to have to be utilized if volunteers' informal behavior is to be integrated into the formal activities of organizations. Groups not using volunteers in the post-disaster period eliminate a major coordination problem.
4. The greater the physical dispersion of organizational activities in the post-disaster period, the greater the problem of overall coordination becomes. When groups can locate their major decision-making units at one or a few central places, an integrated response to the emergency seems to be facilitated.

VI

The remarks above are based upon impressions obtained in the course of field observations and interviews. They do not represent conclusions derived from any

systematic analyses of the transcripts of the tape recorded interviews, or from detailed examination of organizational logs, minutes, and post-disaster critiques. Such observations and propositions as were set forth are tentative and subject to later modification, qualification or revision in the light of a more complete study.

In summary, this is a highly provisional and preliminary working paper and is to be regarded in many respects as the first draft of a research report that the DRC has projected for next year.

FOOTNOTES

1. Of course a re-interpretation did not improve the quality of the interview data, but it did allow recovery of information which interpreters had not fully transmitted at the time of the interviews.
2. For observation by the DRC see R. Dynes, E. Haas and E. L. Quarantelli, Working Paper #2, "Some Preliminary Observations on the Responses of Community Organizations Involved in the Emergency Period of the Alaskan Earthquake, "Columbus, Ohio: The Ohio State University Disaster Research Center, May 28, 1964.
3. See C. Fritz and J. Mathewson, Convergence Behavior in Disasters, Washington: National Academy of Sciences, 1957.
4. Ibid.
5. The manifestations of the disaster syndrome are set forth in A. Wallace Tornado in Worcester, Washington: National Academy of Sciences, 1956. A critique of generalizations about the disaster syndrome as made by Quarantelli in "Images of Withdrawal Behavior in Disasters: Some Basic Misconceptions," Social Problems, 8 (Summer, 1960), pp. 68-79.
6. See A. Barton Social Organization Under Stress: A Sociological Review of Disaster Studies, Washington: National Academy of Sciences, 1962.

THE DISASTER RESEARCH CENTER

The Disaster Research Center, a part of the Department of Sociology at The Ohio State University, was organized in 1963. The Center is engaged in the scientific study of individual, group, organizational and societal responses to community wide disasters and other extreme stress situations. Major focus of the research is placed on obtaining an extensive and detailed picture of the human and social problems generated by disasters, and how they are solved by affected persons, communities and societies. The Center conducts field studies both in this country and overseas. Part of the research of the Center also involves the laboratory study of groups under stress.

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